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AUGUST 11, 1966

CHEMICAL & ENGINEERING

NEWS

Chemical earnings rise again in second quarter
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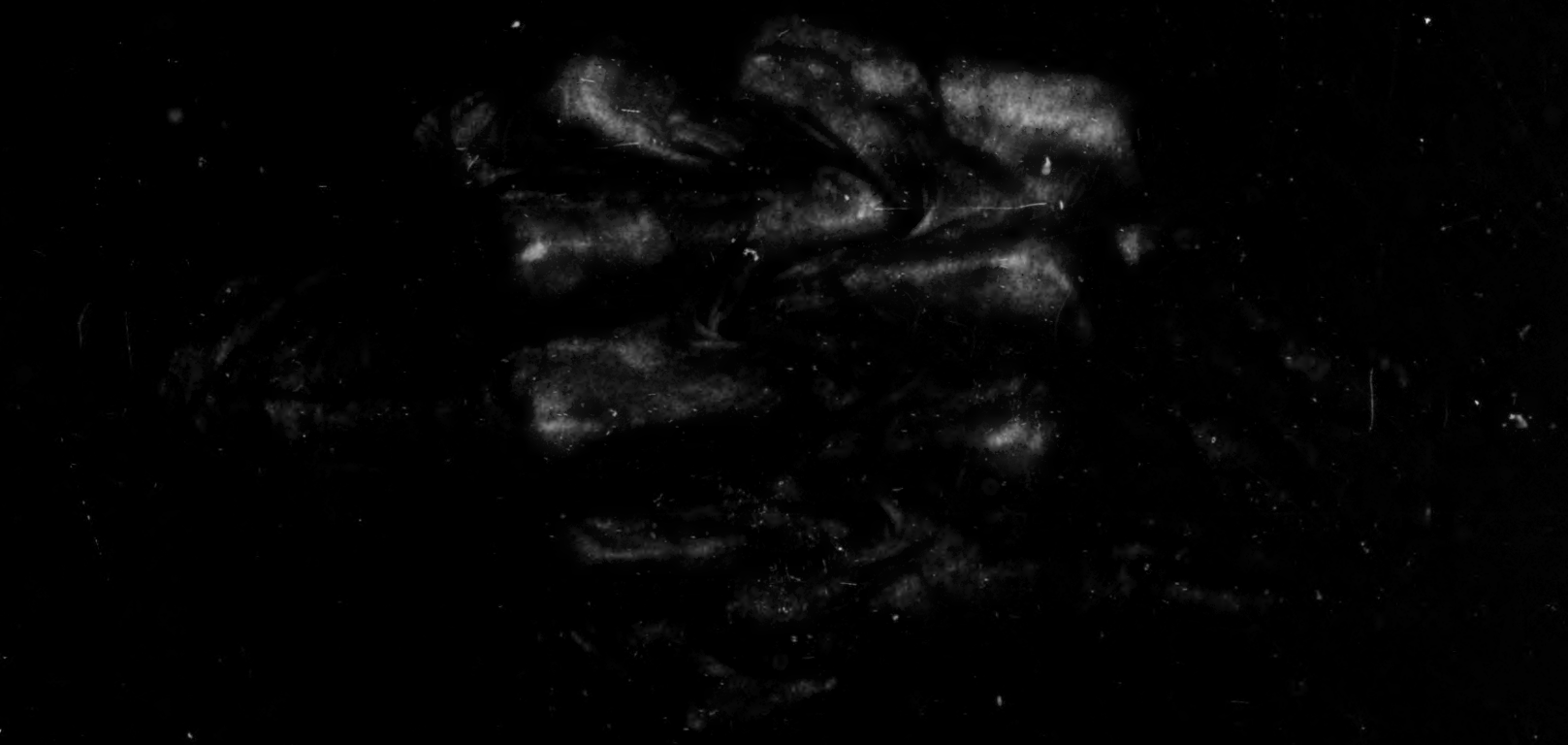

Biochemistry of Growing Old

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■ **NRC advisory panel urges changes in space shuttle redesign program.** **Page 4**

■ **Department of Energy opens Nevada test facility for hazardous fluid spills.** **Page 5**

■ **International trade agreement for fibers and textiles extended through 1991.** **Page 5**

■ **Congress hurries to settle issues on Superfund funding, tax reform, federal debt limit before Aug. 15 recess.** **Page 5**

■ **With *Science Digest* and *Science 86* going to Time Inc., *Scientific American* to West German publisher, all's quiet on the science magazine front.** **Page 6**

■ **National Cancer Institute will test antiviral nucleoside analogs for use against AIDS.** **Page 6**

Cover: Photo courtesy of National Institute on Aging

Business

U.S. chemical companies' earnings continued to increase in the second quarter, but oil firms' earnings were down substantially. **Page 10**

Government

President's decision to begin making binary chemical weapons this fall arouses the ire of some Congressmen. **Page 17**

Texas university professor develops theory of science policy, assessing how scientific knowledge penetrates the governance process. **Page 19**

Science

Research and application opportunities of interfaces and thin films are assessed in NAS/NAE/Institute of Medicine report. **Page 22**

Books

In **"Seven Clues to the Origin of Life"** author A. G. Cairns-Smith uses Sherlock Holmes-type deduction. **Page 40**

ACS News

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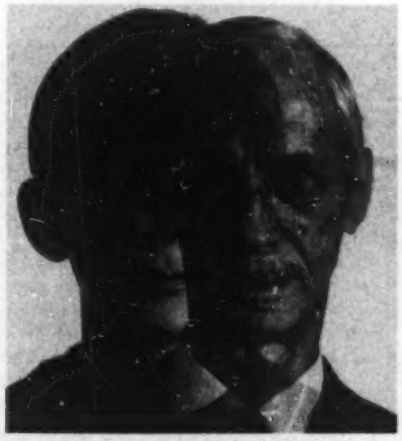


Special Report

The increasingly higher percentage of the elderly in the U.S. population has led to a boost in the biochemical study of aging. Research in a variety of areas has contributed pieces of the jigsaw but by no means is the puzzle complete. **Page 26**

Chemical Companies' Earnings Continue To Rise in Second Quarter

William J. Storck, C&EN New York

Second-quarter earnings improved significantly for most chemical companies and diversified firms producing chemicals. But for most major oil companies, earnings were down substantially although their chemical operations fared well.

The chemical industry is continuing to reap the benefits of the major reorganization and rationalization efforts instituted in the past few years, and for many firms, these effects are accelerating. Plant shutdowns, work-force reductions, and the selling off of marginally profitable operations are having an effect on operating rates and margins, lowering breakeven points and raising profits, often in the face of declining sales dollar volumes.

Add to that some external economic factors such as increased exports as the dollar weakens abroad and subsequent increases in chemical shipments, and the stage is set for improved earnings, not only in the second quarter, but probably for the remainder of this year and into 1987 as well. The weakening of the dollar is a major force that will affect the chemical industry for some time, economists believe. Not only are U.S. products becoming more competitive overseas, but imports into the U.S. are restricted because of price, and U.S. goods likely will fill any void created here. Most trade experts say that in third-party countries, where U.S. goods compete most fairly with goods from other

Chemical industry leaders for the second quarter . . .

Sales

Rank 1986		$ Millions	Rank 1985
1	Dow Chemical	$2904.0	1
2	Monsanto	1869.0	3
3	Union Carbide	1738.0	2
4	W. R. Grace	1410.5	4
5	PPG Industries	1200.0	5
6	American Cyanamid	1027.0	6
7	Chesebrough-Pond's	800.5	9
8	B. F. Goodrich	759.1	7
9	Celanese	743.0	8
10	Hercules	690.8	10

Earnings[a]

	$ Millions	Rank 1985
Dow Chemical	$227.0	1
Monsanto	148.0	2
PPG Industries	91.8	3
Hercules	60.1	10
American Cyanamid	56.5	11
Rohm & Haas	55.9	6
Celanese	55.0	5
Ethyl Corp.	45.1	8
Chesebrough-Pond's	44.6	13
Union Carbide	43.0	4

Profitability

	Earnings as % of sales	Rank 1985
International Flavors	14.9%	1
Freeport-McMoRan	12.1	2
Ethyl Corp.	11.1	4
Loctite	10.9	9
Rohm & Haas	9.8	11
Hercules	8.7	16
Monsanto	7.9	10
Dow Chemical	7.8	15
Petrolite	7.8	5
PPG Industries	7.7	7

. . . and for the first six months of 1986

Sales

Rank 1986		$ Millions	Rank 1985
1	Dow Chemical	$5756.0	1
2	Monsanto	3614.0	3
3	Union Carbide	3358.0	2
4	W. R. Grace	2661.0	4
5	PPG Industries	2300.0	5
6	American Cyanamid	1944.9	6
7	Chesebrough-Pond's	1607.5	10
8	Celanese	1490.0	8
9	B. F. Goodrich	1487.9	7
10	Hercules	1336.0	9

Earnings[a]

	$ Millions	Rank 1985
Dow Chemical	$402.0	1
Monsanto	266.0	2
PPG Industries	161.0	3
Celanese	106.0	5
American Cyanamid	105.6	7
Hercules	105.5	9
Rohm & Haas	94.2	6
Chesebrough-Pond's	93.7	16
Union Carbide	80.0	4
Ethyl Corp.	77.2	10

Profitability

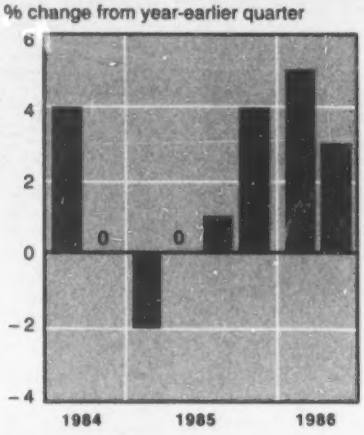
	Earnings as % of sales	Rank 1985
International Flavors	14.9%	1
Freeport-McMoRan	11.9	2
Ethyl Corp.	9.8	5
Loctite	9.2	7
Rohm & Haas	8.5	9
Hercules	7.9	18
Petrolite	7.7	4
Nalco Chemical	7.7	3
Monsanto	7.4	13
Air Products	7.1	6
Celanese	7.1	15

a After taxes. **Note:** For 30 chemical companies listed on page 12.

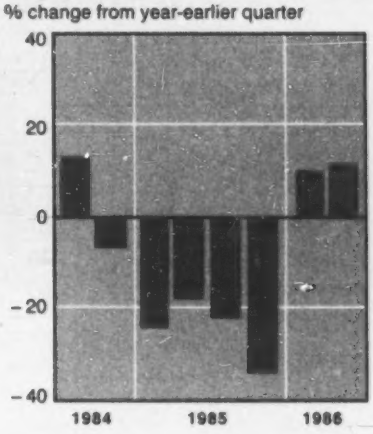
Chemical industry second-quarter 1986 results

- Sales were up slightly
- Earnings rose again
- Profit margins increased
- Production climbed
- Prices tumbled

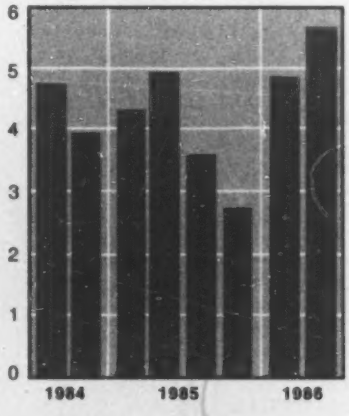
Sales



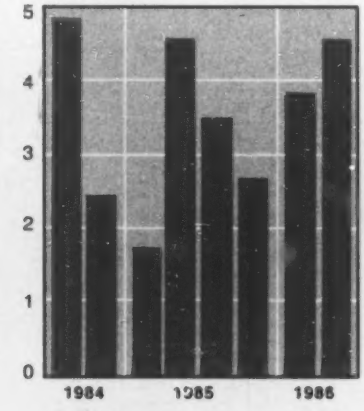
Earnings



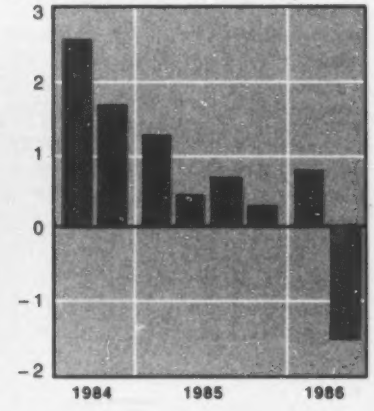
Profit margins



Production

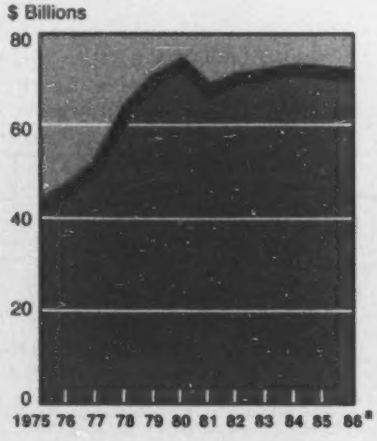


Prices

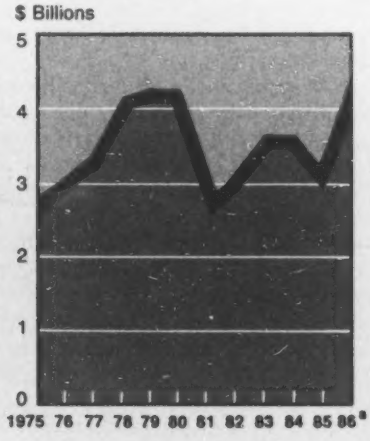


Sales in 1986 will remain near last year's level, but earnings will climb, pushing profit margins up

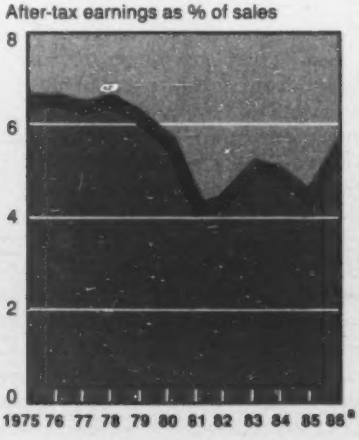
Annual sales



Annual earnings



Annual profit margins



a C&EN estimates. **Note:** All sales, earnings, and profit-margin data are based on combined sales of the 30 companies listed on page 12.

For 30 major chemical firms, earnings rose an average 12% from year earlier

	SECOND-QUARTER 1986						FIRST-HALF 1986			
	Sales	Earnings[a]	Change from 1985		Profit margin[b]		Sales	Earnings[a]	Change from 1985	
	($ millions)		Sales	Earnings[a]	1986	1985	($ millions)		Sales	Earnings[a]
Air Products[c]	$ 494.9	$ 32.7	8%	−13%	6.6%	8.2%	$1003.8	$ 71.8	9%	−2%
American Cyanamid[c]	1027.0	56.5	13	75	5.5	3.5	1944.9	105.6	8	41
Celanese[c]	743.0	55.0	−5	12	7.4	6.3	1490.0	106.0	−2	25
Chemed	103.3	4.6	11	6	4.4	4.7	197.6	10.5	9	−14
Chesebrough-Pond's[c]	800.5	44.6	3	114	5.6	2.7	1607.5	93.7	37	178
Crompton & Knowles	64.7	2.6	5	11	3.9	3.7	126.8	4.5	8	30
Dow Chemical[c]	2904.0	227.0	−3	46	7.8	5.2	5756.0	402.0	0	52
Essex Chemical	60.8	3.9	3	11	6.4	6.0	111.5	6.4	7	9
Ethyl Corp.	406.0	45.1	0	25	11.1	8.9	784.0	77.2	0	20
First Mississippi	64.2	2.0	−14	−65	3.1	7.8	129.7	4.3	−9	−56
Freeport-McMoRan	161.1	19.4	−16	−8	12.1	11.0	326.0	38.6	−20	−15
H. B. Fuller	132.8	5.3	15	52	4.0	3.0	252.0	8.1	12	54
B. F. Goodrich[c]	759.1	8.7	−8	−30	1.1	1.5	1487.9	−13.5	−7	def
W. R. Grace[c]	1410.5	3.4	3	−90	0.2	2.5	2661.0	0.3	4	−99
Hercules[c]	690.8	60.1	−1	77	8.7	4.9	1336.0	105.5	0	51
International Flavors	162.1	24.1	25	26	14.9	14.8	310.1	46.2	24	25
International Minerals[c]	434.1	−18.0	31	def	def	3.3	850.6	−20.2	14	def
Loctite	73.9	8.1	23	76	10.9	7.7	140.8	12.9	24	45
Lubrizol	259.0	19.0	5	7	7.3	7.2	533.9	36.4	7	−2
Monsanto[c]	1869.0	148.0	15	19	7.9	7.6	3614.0	266.0	11	26
Nalco Chemical	184.0	14.1	11	−17	7.6	10.2	362.5	28.1	10	−13
National Distillers[c]	530.8	11.4	4	185	2.1	0.8	1162.3	32.2	7	31
Olin[c]	440.8	14.7	−4	7	3.3	3.0	892.2	40.0	−11	55
Pennwalt	289.3	11.4	8	−11	3.9	4.8	393.9	25.4	12	29
Petrolite	74.6	5.8	−3	−12	7.8	8.6	150.4	11.6	−2	−15
PPG Industries[c]	1200.0	91.8	9	3	7.7	8.1	2300.0	161.0	5	−5
Reichhold Chemicals	212.7	3.0	−10	49	1.4	0.9	422.4	4.0	0	−10
Rohm & Haas[c]	569.0	55.9	3	35	9.8	7.5	1109.8	94.2	0	15
Union Carbide[c]	1738.0	43.0	0	−48	2.5	4.8	3358.0	80.0	0	−40
Witco	347.4	17.4	−6	18	5.0	4.0	691.0	31.5	−6	22
Total 15 largest companies[d]	**$15611.5**	**$ 834.8**	**3%**	**12%**	**5.3%**	**4.9%**	**$30574.0**	**$1524.6**	**4%**	**13%**
Second 15 companies	**$ 2595.8**	**$ 185.7**	**2%**	**9%**	**7.2%**	**6.7%**	**$ 4932.4**	**$ 345.8**	**2%**	**6%**
GRAND TOTAL[d]	**$18,207.3**	**$1020.5**	**3%**	**12%**	**5.6%**	**5.2%**	**$35,506.4**	**$1870.4**	**4%**	**12%**

a After-tax earnings from continuing operations, excluding significant extraordinary and nonrecurring items. b After-tax earnings as a percentage of sales. c One of 15 largest companies. d 12-month running data exclude Dow because of large nonrecurring item in fourth-quarter 1985 results. nm = not meaningful. def = deficit.

countries, foreign producers still may have an advantage because of discounting and home country government subsidies. But, they say, these will disappear over time as it becomes increasingly expensive to prop up those markets.

The falling crude oil price also has helped considerably. The results of this were seen initially at the end of the first quarter, but they have accelerated in the second quarter. As oil prices fall, petrochemical producers are receiving a real cost break for feedstocks. Although the price drop in oil has caused product prices in the chemical industry to fall, feedstock costs have fallen even more rapidly, thereby providing considerable earnings leverage to the industry.

As a result of the underlying economic activity, the U.S. chemical industry in the second quarter performed well, continuing the earnings advance begun in the first three months of this year.

For 30 major chemical companies surveyed by C&EN, earnings increased an average 12% from a year earlier to a total of $1.02 billion. Sales increased 3% to a combined $18.2 billion, raising profit margins (after-tax earnings as a percentage of sales) to a much more respectable 5.6% from 5.2% in second-quarter 1985.

For the period, the larger, more diversified chemical companies outperformed the smaller companies in terms of sales and earnings growth, but not profit margins. The 15 larger firms increased earnings 12%, the same as the total group, to a combined $835 million on a 3% sales increase to $15.6 billion.

Earnings for the 15 smaller firms increased 9% in the quarter to a combined $186 million on a 2% growth in sales to $2.60 billion.

Profit margins for the larger companies averaged 5.3%, up from 4.9% a year earlier, but margins for the smaller companies averaged 7.2%, up from 6.7% in last year's second quarter.

For the first six months of this

FIRST-HALF 1986		12-MONTH RUNNING DATA			
Profit margin[b]		Change from 1985		Profit margin[b]	
1986	1985	Sales	Earnings[c]	1986	1985
7.0%	8.0%	10%	5%	7.4%	7.7%
5.4	4.2	−1	4	4.7	4.5
7.1	5.6	−5	34	6.7	4.8
5.3	6.8	8	14	4.8	4.5
5.8	2.9	47	60	3.8	3.5
3.6	3.0	7	19	3.6	3.2
7.0	4.6	2	nm	nm	3.7
5.8	5.7	6	−19	4.5	5.9
9.8	8.2	−3	9	9.7	8.7
3.3	6.8	−2	−62	2.6	6.7
11.9	11.2	−23	−27	11.0	11.5
3.2	2.3	8	32	3.3	2.7
def	0.9	−5	def	def	0.9
0.0	1.6	−9	−47	1.1	1.9
7.9	5.2	−2	−2	6.6	6.6
14.9	14.7	18	19	14.1	14.0
def	5.6	1	def	def	6.2
9.2	7.8	15	−2	8.7	10.3
6.8	7.4	4	−8	6.4	7.3
7.4	6.5	11	−28	3.3	5.1
7.7	9.8	8	−9	9.3	11.0
2.8	2.3	8	46	2.8	2.1
4.5	2.6	−11	−1	3.2	2.8
6.4	5.6	2	−67	1.5	4.7
7.7	8.9	0	−26	6.7	9.0
7.0	7.7	5	−7	6.6	7.4
1.0	1.1	4	def	def	2.1
8.5	7.4	0	5	7.5	7.1
2.4	4.0	−13	−40	2.2	3.2
4.6	3.5	−5	10	4.4	3.8
5.0%	**4.6%**	**0%**	**−15%**	**3.6%**	**4.2%**
7.0%	**6.7%**	**0%**	**−11%**	**6.1%**	**6.9%**
5.3%	**4.9%**	**0%**	**−14%**	**4.0%**	**4.6%**

year, earnings for the 30 companies rose 12% from last year's first half to a combined $1.87 billion on a sales increase of 4% to $35.5 billion. For the 15 larger firms, first-half earnings climbed 13% to a combined $1.52 billion, and sales increased 4% to $30.6 billion. And for the 15 smaller companies, earnings increased 6% to $346 million, and sales rose 2% to $4.93 billion.

First-half profit margins for the total group rose to 5.3% from 4.9% in first-half 1985. For the larger companies, profit margins averaged 5.0% in the first half (compared with 4.6% a year earlier), and for the smaller firms, margins averaged 7.0% (compared with 6.7% in 1985's first half).

Had it not been for poor results by a few companies, the earnings increase in the quarter would have been much greater. Some of these, such as International Minerals and W. R. Grace, were affected by the continuing slump in fertilizer markets. But one big factor in moderating the earnings rise was Union Carbide, which had a $40 million, or 48%, decline in earnings in the quarter brought on by its defense against the takeover attempt by GAF last year. Without Carbide, earnings from the other 29 companies averaged an 18% increase over the same period in 1985.

Carbide's decline was brought on by a $95 million increase in pretax interest expense in the quarter and a nonrecurring gain of $27 million pretax in the second quarter of 1985. If those two items could be eliminated, Carbide's pretax income from continuing operations in the second quarter could have been $166 million, almost double the $89 million in the second quarter last year.

The positioning of companies for future earnings growth got a lot of comment from corporate executives. For instance, Richard J. Mahoney, chairman and chief executive officer of Monsanto, says: "Monsanto's second-quarter results clearly reflect an enhanced level of profitability vs. last year's second quarter. The substantial cost-cutting and overhead reductions that occurred last year are paying off in terms of improving profit trends for the chemical company's higher-value-added products. Further, Monsanto's core chemical businesses continue to benefit from lower manufacturing costs."

At Goodrich, chairman John D. Ong says, "Our businesses performed as expected during the second quarter, and we are beginning to see the positive results of our restructuring program. ... At this point we are making progress in transforming Goodrich into a significantly different company. After the formation of Uniroyal Goodrich Tire Co., nearly 80% of our revenues will come from chemicals, with the remainder from aerospace and industrial rubber products."

The improvement in international markets helped some of the companies. Dow executive vice president Robert M. Keil comments, "Business activity worldwide was relatively strong, with Dow U.S.A.'s performance and that of Dow Pacific and Dow Brazil being especially positive. Global volume remained high in response to demand increases."

Borden chairman Eugene J. Sullivan notes that operating income from the company's worldwide chemical division surged almost 51%. Overseas, he says, the divi-

Ground rules for C&EN earnings analysis

C&EN's quarterly report on financial performance of the U.S. chemical industry contains data from the 30 largest U.S. basic chemical companies and from 37 oil and diversified companies, each with more than $200 million in annual chemical sales.

To be included in the table of basic chemical producers, a company must have at least 40% of its sales in chemicals, and its chemical operations must be the largest single portion of the total operations. That is why Du Pont, for example, is included in the table of diversified manufacturers.

In referring to chemical sales, C&EN means those chemicals whose molecular composition has been changed in the course of manufacture. Hence, chemical sales include those of traditional categories of basic petrochemicals and inorganics, organic intermediates and inorganic compounds, polymers, agricultural chemicals, and specialty derivatives.

In listing earnings, the survey gives after-tax income for continuing operations before nonrecurring items and extraordinary charges. Foreign currency translations are included.

Earnings plummeted for oil companies, but were varied for diversified firms

	Chemical sales as % of total	SECOND-QUARTER 1986						FIRST-HALF 1986					
		Sales ($ millions)	Earnings[a] ($ millions)	Change from 1985 Sales	Change from 1985 Earnings[a]	Profit margin[b] 1986	Profit margin[b] 1985	Sales ($ millions)	Earnings[a] ($ millions)	Change from 1985 Sales	Change from 1985 Earnings[a]	Profit margin[b] 1986	Profit margin[b] 1985
OIL AND GAS COMPANIES													
American Petrofina	15%	$ 476.0	$ 4.4	−19%	−72%	0.9%	2.7%	$ 983.4	$ −35.3	−16%	def	def	1.6%
Amoco	14	5,011.0	253.0	−31	−58	5.0	8.2	10,929.0	584.0	−24	−46%	5.3%	7.5
Ashland	18	1,800.0	80.0	−14	33	4.4	2.9	3,600.0	119.0	−8	61	3.3	1.9
Atlantic Richfield	17	3,549.0	150.0	−39	−63	4.2	7.0	7,836.0	449.0	−32	−42	5.7	6.7
Chevron	6	6,800.0	297.0	−42	−14	4.4	3.0	15,600.0	535.0	−36	−24	3.4	2.9
Exxon	12	17,981.0	1137.0	−22	−11	6.3	5.5	40,224.0	3074.0	−13	21	7.6	5.5
Kerr-McGee	14	625.7	3.2	−26	−92	0.5	4.8	1,344.6	25.3	−19	−63	1.9	4.2
Mobil	5	12,236.0	386.0	−14	−6	3.2	2.9	26,113.0	883.0	−11	21	3.4	2.5
Occidental Petroleum	10	3,827.2	38.7	4	−72	1.0	3.7	7,458.0	112.9	1	−49	1.5	3.0
Phillips Petroleum	15	2,340.0	52.0	−41	−56	2.2	2.9	5,450.0	148.0	−31	−36	2.7	2.9
Shell Oil	18	4,164.0	219.0	−18	−35	5.3	6.6	8,830.0	495.0	−10	−22	5.6	6.4
Standard Oil (Ohio)	5	2,606.0	123.0	−25	−68	4.7	11.2	5,511.0	376.0	−18	−49	6.8	11.0
Texaco	3	7,900.0	185.0	−32	−33	2.3	2.4	17,500.0	513.0	−26	6	2.9	2.0
Unocal (Union Oil)	11	2,103.0	34.6	−27	−71	1.6	4.2	4,382.9	104.8	−23	−65	2.4	5.3
Williams Cos.	24	507.0	7.2	−30	−60	1.4	2.5	1,303.4	21.4	−26	−54	1.6	2.6
DIVERSIFIED MANUFACTURERS													
Allied-Signal	24	2,943.0	143.0	22	8	4.9	5.5	5,852.0	329.0	20	23	5.6	5.5
Aluminum Co. of America	5	1,232.2	53.3	−10	−5	4.3	4.1	2,409.5	54.7	−10	−13	2.3	2.3
Big Three	49	164.9	10.5	−22	−15	6.4	5.9	368.5	24.4	−9	2	6.6	5.9
Borden	33	1,236.9	52.0	4	12	4.2	3.9	2,373.3	88.6	5	10	3.7	3.6
Borg-Warner	28	933.4	51.0	9	4	5.5	5.7	1,828.9	100.4	11	7	5.5	5.7
Cabot	51	310.1	13.1	−12	−11	4.2	4.2	650.3	30.8	−6	−11	4.7	5.0
Du Pont	38	6,909.0	456.0	−6	−41	6.6	4.4	14,078.0	860.0	−3	85	6.1	3.2
Eastman Kodak	22	2,694.6	155.6	10	−5	5.8	6.7	5,040.0	247.1	10	−12	4.9	6.1
Eli Lilly	22	879.3	125.7	16	14	14.3	14.5	1,867.6	198.3	12	−27	10.6	16.3
Emhart	15	527.9	19.8	17	−26	3.8	5.9	1,037.5	37.8	19	−10	3.6	4.8
Engelhard	26	492.8	15.4	3	50	3.1	2.1	1,019.1	26.8	−3	22	2.6	2.1
FMC	39	807.4	49.2	−8	−10	6.1	6.2	1,559.7	74.9	−5	−24	4.8	6.0
GAF	49	198.3	22.2	5	44	11.2	8.2	374.3	37.2	3	40	9.9	7.3
General Electric	8	7,790.0	621.0	14	5	8.0	8.6	13,670.0	1158.0	5	5	8.5	8.4
Georgia-Pacific	4	1,929.0	86.0	8	28	4.5	3.7	3,533.0	116.0	5	0	3.3	3.4
Kaiser Aluminum	13	554.2	−29.6	7	def	def	def	1,084.9	−22.4	10	def	def	def
Koppers	44	370.9	17.8	−2	80	4.8	2.6	627.9	17.2	−1	def	2.7	def
Merck	13	1,005.0	173.2	15	26	17.2	15.7	1,926.1	331.0	11	23	17.2	15.5
3M	15	2,185.0	198.0	12	14	9.1	8.9	4,254.0	379.0	10	10	8.9	8.9
Morton Thiokol	35	490.5	30.0	−9	7	6.1	5.2	1,009.0	66.1	6	10	6.6	6.3
NL Industries	40	315.9	−34.4	−12	def	def	1.9	675.2	−35.4	−2	def	def	1.6
Pfizer	10	1,117.9	156.1	12	14	14.0	13.7	2,150.0	325.0	10	14	15.1	14.6
Tyler	41	248.4	4.3	3	−24	1.7	2.3	478.6	7.9	4	−10	1.7	1.9
U.S. Steel	6	4,200.0	−87.0	−22	def	def	2.8	8,851.0	−86.0	−15	def	def	3.2
Vulcan Materials	30	256.6	31.7	−2	19	12.4	10.2	457.2	38.6	−1	14	8.4	7.4

a From continuing operations excluding significant extraordinary and nonrecurring items. b After-tax earnings as a percentage of sales. def = deficit.

sion's operations in southern Latin America had a major turnaround, "led by our chemical subsidiaries in Brazil and Argentina." He also says that profits for European chemical operations were up more than 75% although profits for northern Latin America were about the same as they were a year ago.

Borg-Warner says its chemicals continued strong in the second quarter, particularly in Europe.

The dark cloud over the chemical industry continues to be agricultural chemicals—particularly fertilizers, with mixed results from pesticide operations. For example, James R. Moffett, chairman of Freeport-McMoRan, explains that "demand for agricultural minerals continues to be limited by surplus grain stocks, low farm product prices, and the depressed state of the farm economy. Nevertheless, we are confident that our highly efficient, low-cost agricultural minerals operations will continue to perform satisfactorily."

Chemical earnings rise rapidly for most energy companies

If the oil companies had not had chemical operations this year, they would have been in much worse shape than they were. While overall earnings at the major oil companies were falling rapidly in the second quarter, chemical earnings were helping to save the bottom line. The same holds true for the entire first half.

As oil prices declined, earnings from these companies' oil operations fell drastically. But those same falling oil prices make petrochemical feedstocks much cheaper, and since the oil companies are predominantly producers of petrochemicals as far as their chemical operations go, those earnings soared.

For a group of seven oil companies that are also major chemical producers, earnings from chemicals in the second quarter rocketed an aggregate 71%. For the first half, total chemical earnings for the seven companies more than doubled, up 105%.

At Exxon, where chemical net earnings increased 71%, chairman C. C. Garvin Jr. said, "Petroleum product and chemical prices have fallen less rapidly than crude costs. This fact, combined with the weakening of the dollar, has had a significant positive impact on margins in refining, marketing, and chemicals." Chemical margins were improved both in the U.S. and abroad, the company says.

That was echoed at Mobil, which had a 78% earnings increase in the second quarter to $32 million. The company says that improved petrochemical and plastics margins and volumes, both in the U.S. and overseas, provided most of the income increase.

Of the seven companies, Chevron and Shell more than doubled their previous year's earnings. And large gains were posted by Mobil (78%), Atlantic Richfield (64%), and Amoco (40%). Texaco had the lowest increase on the list and even it was a healthy 20%.

For some of the oil companies not reporting chemical net earnings, the second quarter seemed just as good. Standard Oil (Ohio) says chemical earnings improved over last year's second quarter in the acrylonitrile business because of better margins. For industrial products earnings improved primarily because of higher volumes and prices for titanium dioxide slag.

Phillips Petroleum says that its chemical operations' higher earnings resulted from lower feedstock and operating costs, but these were partially offset by lower prices.

Only Williams, with its long-suffering fertilizer operations, seems to have room to complain. Its Agrico Chemical Co. had a second-quarter operating profit of $5.6 million, down from $17.6 million in the same period last year. The firm says sales volumes in North America were down 31% and prices were down for most products.

EARNINGS ON CHEMICAL OPERATIONS

	Second quarter		%	First half		%
$ Millions	1986	1985	change	1986	1985	change
Amoco	$ 70.0	$50.0	40%	$142.0	$ 99.0	43%
Atlantic Richfield	41.0	25.0	64	67.0	46.0	46
Chevron	31.0	15.0	107	62.0	35.0	77
Exxon	123.0	72.0	71	238.0	117.0	103
Mobil	32.0	18.0	78	64.0	11.0	482
Shell	76.0	35.0	117	148.0	49.0	202
Texaco	12.0	10.0	20	18.0	3.0	500

In the second quarter, W. R. Grace, whose total earnings declined 90%, suffered a $9 million loss in agricultural chemicals, compared with a $1.4 million loss in the same period in 1985. Grace says its agricultural chemicals business was plagued by persistent poor pricing conditions, excessive inventories, and lower sales volume.

But all was not bad in the agricultural market. Some pesticides turned in better results, although that was spotty. Monsanto's Mahoney says that because the U.S. corn and soybean acreage was reduced this year, Lasso herbicide finished the planting season down from last year. A significant volume improvement, however, for Roundup in the first half of 1986 more than offset weak volumes for Lasso. Currency translation gains owing to a weaker dollar also aided the worldwide profits from Roundup, which added to the overall performance of Monsanto's crop chemicals. For the quarter, operating income from the company's crop chemicals increased 15% over last year's second quarter to $154 million on a sales rise of 8%.

American Cyanamid says its agricultural group had increased sales and sharply higher operating earnings in the quarter. The performance, it says, resulted from strong worldwide sales of crop protection chemicals, particularly Scepter herbicide, which was introduced to the U.S. soybean market.

Other companies were not so fortunate with agricultural chemicals, however. PPG Industries' agricultural chemicals sales volume and prices generally trailed those of last year. Sales of Chesebrough-Pond's agricultural products unit fell 11% to $123 million. And Rohm & Haas' performance of agricultural chemicals, excluding seeds, in North America was about the same as last year.

Still, companies are optimistic about the future. Dow's Keil says, "Dow's daily sales volume, excluding feedstocks, reached its highest level in seven years this quarter, and we are entering the third quarter with an encouraging order pattern. Continuation of this trend will help buffer the normal seasonal business decline that characterizes this period and provide good momentum for subsequent gains in the remaining quarters."

Even IMC's Kennedy is optimistic about the fertilizer business. He says the firm is well positioned for a turnaround in fertilizers. "Things within our ability to control—our costs, productivity, efficiency, working capital, and the like—are in the most competitive position in our history. All that will pay off as the agricultural economy turns upward." □